

Tanggapan Fisiologis Tanaman Padi (*Oryza sativa* L.) 'IR64' dan 'Situ Bagendit' yang Diinokulasi Menggunakan Rhizobakteri Osmotoleran (*Enterobacter flavescens*) pada Kondisi Kekeringan

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INTISARI

Padi (*Oryza sativa* L.) memiliki mekanisme untuk pertahanan diri secara morfologis, fisiologis, maupun biokimiawi dalam menghadapi cekaman lingkungan, misalnya kekeringan. Kemampuan asosiasi rhizobakteri yang mampu bertahan pada cekaman kekeringan dengan tanaman dapat dimanfaatkan sebagai inokulum dalam budidaya tanaman. Penelitian ini bertujuan untuk mengetahui tanggapan padi 'IR64' dan 'Situ Bagendit' terhadap inokulasi rhizobakteri osmotoleran pada kondisi kekeringan. Penelitian dilakukan dengan menggunakan Rancangan Acak Lengkap 3 faktor perlakuan, yaitu 2 kultivar padi ('IR64' dan 'Situ Bagendit'), 3 perlakuan kekeringan (25%, 50% dan 100% kapasitas lapangan), serta 2 jenis perlakuan rhizobakteri (tanpa inokulasi dan dengan inokulasi rhizobakteri osmotoleran (*Enterobacter flavescens*)). Parameter yang diamati yaitu parameter pertumbuhan berupa tinggi tanaman, jumlah daun, anakan dan malai, biomassa akar dan tajuk, dan persentase gabah isi; parameter fisiologis berupa *Index Stability Membrane* (ISM) dan *Relative Water Content* (RWC), kandungan klorofil, karotenoid, prolin, serta aktivitas enzim oksidatif (*Superoxide Dismutase* (SOD), *Ascorbate Peroxidase* (APX), *Catalase* (CAT), dan *Peroxidase* (POX)). Data yang diperoleh diuji dengan ANOVA dan uji DMRT dengan taraf kepercayaan 95%. Inokulasi menggunakan rhizobakteri osmotoleran meningkatkan pertumbuhan tanaman, berupa tinggi tanaman, jumlah daun, anakan dan malai; kandungan prolin, aktivitas SOD, APX serta POX, sedangkan biomassa akar dan tajuk serta kandungan karotenoid lebih tinggi pada tanaman tanpa inokulasi rhizobakteri osmotoleran. Aktivitas CAT, ISM serta KAR pada kedua kedua kultivar tidak berbeda nyata antara perlakuan dengan inokulasi maupun tanpa inokulasi rhizobakteri osmotoleran. Persentase gabah isi pada 'IR64' meningkat dengan adanya inokulasi rhizobakteri osmotoleran.

Kata Kunci : 'IR64', 'Situ Bagendit', Cekaman Kekeringan, Rhizobakteri Osmotoleran, *Enterobacter flavescens*

Physiological Responses of Rice (*Oryza sativa* L.) 'IR64' and 'Situ Bagendit' Inoculated with Osmotolerant Rhizobacteria (*Enterobacter flavescens*) under Drought Condition

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ABSTRACT

Rice (*Oryza sativa* L.) has mechanisms for morphological, physiological, and biochemical self-defense in response to environmental stress, such as drought. The ability of osmotolerant rhizobacteria to develop association with plant opens its potential as an inoculum for supporting plant growth under drought stress. This study aims at establishing the response of 'IR64' and 'Situ Bagendit' to the inoculation using osmotolerant rhizobacteria under drought condition. The study was conducted using a completely randomised design with 3 treatment factors, namely 2 rice cultivars ('IR64' and 'Situ Bagendit'), 3 drought treatments (25%, 50% and 100% field capacity), and 2 types of rhizobacterial treatment (without inoculation and with inoculation using osmotolerant rhizobacteria (*Enterobacter flavescens*)). The parameters observed were growth parameters in the form of plant height, number of leaves, tillers and panicles, root and canopy biomass, and percentage of filled grain. Physiological parameters observed were chlorophyll content, carotenoids, proline, and oxidative enzyme activity (SOD, APX, CAT, and POX), ISM and RWC. The data obtained were tested by ANOVA and DMRT test with a confidence level of 95%. Inoculation using rhizobacteria osmotolerant enhanced plant growth, as measured by plant height, number of leaves, tillers and panicles, as well as proline content, SOD, APX and POX activity, but plant biomass and carotenoid content were higher in plants without inoculation. CAT activity, Ism and RWC in two cultivars were no significantly different. The percentage of fill grain in 'IR64' increased with the inoculation of osmotolerant rhizobacteria.

Keywords: 'IR64', 'Situ Bagendit', Drought Stress, Osmotolerant Rhizobacteria, *Enterobacter flavescens*